

ABSTRACT

This invention relates to novel photochromic and electrochromic monomers and polymers
5 based on 1,2-dithienylcyclopentene derivatives and method of using and synthesizing same.
The compounds are reversibly interconvertible between different isomeric forms under
suitable photochromic or electrochromic conditions. The electrochromic conversion may be
catalytic. The application also relates to ultra-high density homopolymers prepared using
ring-opening metathesis polymerization (ROMP) where the central ring of the 1,2-bis(3-
10 thienyl)-cyclopentene is incorporated directly into the polymer backbone. The monomer
units may be readily functionalized to enable the synthesis of polymers with diverse
structural and electronic properties. The compounds have many potential applications
including high-density optical information storage systems, photoregulated molecular
switches, reversible holographic systems, ophthalmic lenses, actinometry and molecular
15 sensors, photochromic inks, paints and fibers and optoelectronic systems such as optical
waveguides, Bragg reflectors and dielectric mirrors.